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Title: Deuterium Adsorption on Water Preadsorbed Uranium-Niobium Alloys

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"Deuterium Adsorption on Water Preadsorbed Uranium-Niobium Alloys"

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We have investigated the adsorption/reaction of deuterium on water preadsorbed oxidized uranium-niobium alloys at pressures near 1 Torr. Deuterium exposures were conducted at pressures from 1 to 4 Torr at surface temperatures between 300 and 600 K using a fixed dosing time of 30 seconds. Water is preadsorbed at room temperature at a pressure of ~ 1 Torr for 30 seconds. Subsequent to gaseous exposure the surface temperature of the alloy was increased in a controlled manner and deuterium desorption was monitored using mass spectroscopy. Deuterium is observed to adsorb both at the surface and in the bulk of the uranium-niobium alloys. Water preadsorption prevents deuterium adsorption on all surfaces. The water forms a surface passivation layer at low temperatures that prevents deuterium uptake into the bulk and surface of the sample. As the adsorption temperature of the deuterium increases the amount of deuterium that adsorbs also increases.